

LXX

INTERSTATE COMMERCE COMMISSION

WASHINGTON

REPORT NO. 3556

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC RAILROAD COMPANY

IN RE ACCIDENT

NEAR CHILLICOTHE, MO., ON

DECEMBER 21, 1953

SUMMARY

Date:	December 21, 1953
Railroad:	C. M. St. P. & P.
Location:	Near Chillicothe, Mo.
Kind of accident:	Petticoat pipe failure
Train involved:	Freight
Train number:	Extra 382 East
Locomotive number:	382
Consist:	92 empty cars
Speed:	35 m. p. h.
Operation:	Freight movement
Time:	1:20 a. m.
Casualties:	1 injured
Cause:	Defective and improperly applied petticoat pipe became displaced and closed exhaust opening to stack, resulting in back draft.

INTERSTATE COMMERCE COMMISSION

REPORT NO. 3556

IN THE MATTER OF MAKING ACCIDENT INVESTIGATION
REPORTS UNDER THE LOCOMOTIVE INSPECTION ACT
OF FEBRUARY 17, 1911, AS AMENDED

CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC RAILROAD

March 10, 1954

Accident near Chillicothe, Mo., on December 21, 1953, caused by
failure of petticoat pipe in smokebox.

REPORT OF THE COMMISSION¹

CLARKE, Commissioner:

On December 21, 1953, about 1:20 a.m., near Chillicothe, Mo., the petticoat pipe in smokebox of Chicago, Milwaukee, St. Paul & Pacific Railroad locomotive 382 became displaced and diverted the flow of exhaust steam causing heavy back draft while the locomotive was hauling a freight train at an estimated speed of 35 miles per hour. The head brakeman was seriously injured.

¹Under authority of section 17 (2) of the Interstate Commerce Act the above-entitled proceeding was referred by the Commission to Commissioner Clarke for consideration and disposition.

DESCRIPTION OF ACCIDENT

Chicago, Milwaukee, St. Paul & Pacific Railroad locomotive No. 382, hauling eastbound freight train Extra 382 East, departed from Kansas City, Mo., December 20, 1953, about 9:00 p.m., and proceeded without unusual incident to a point 3 miles west of Chillicothe, Mo., a distance of approximately 80 miles from Kansas City, where, at about 1:20 a.m., December 21, while the train was moving at an estimated speed of 35 miles per hour, the petticoat pipe and attached stack extension in the smokebox became partially detached from connections to the spark arrester and the base of outside stack and was displaced to a position in which exhaust steam could no longer escape through the petticoat pipe and stack. Because of the diversion, pressure developed in the smokebox and the exhaust traveled back through the flues and firebox, forcing fire, steam, and smoke through openings around firebox door, stoker holes, and ash pan into the cab.

The train consisted of 92 empty cars, 2300 tons, when it left Kansas City. The division tonnage rating for locomotives of this class was 3000 tons.

The head brakeman was seriously injured when he jumped from the right gangway to the ground. The engineer and fireman who were occupying their respective cab seats at the time of the accident sustained facial burns before escaping from the cab but were not seriously injured.

DESCRIPTION OF LOCOMOTIVE

Locomotive No. 382, 2-8-2 type, was built by the American Locomotive Company in 1919; cylinders 27 x 32 inches; driving wheels 63 inches in diameter; total weight of engine in working order 320,000 pounds; weight on driving wheels 243,000 pounds; tractive effort 62,949 pounds; working steam pressure 200 pounds per square inch. It was equipped with a dome type throttle, type E superheater, an open type spark arrester in smokebox, and four arch tubes supporting a brick arch. The firebox was 120-1/2 x 84-1/4 inches and had a modified combustion chamber 20 inches in length; grate area 70.8 square feet. Firebox was equipped with a Franklin mechanically operated clamshell type fire door and a duplex stoker. The rectangular tender had capacity for 10,000 gallons of water and 16 tons of coal.

DESCRIPTION OF PARTS INVOLVED

The cone-shaped petticoat pipe was made of 3/16-inch sheet iron, 33 inches in diameter at base, 31 inches in height, and 23 inches in diameter at the top. The base of the pipe had been

joined to the top ring of the spark arrester drum by sixteen 2-inch spot welds. The top edge of the pipe and lower edge of stack extension had been joined by a fusion weld to form an integral section, terminating at the base of the main stack where it was attached to main stack by six brackets held in place by 5/8 x 5-inch double-nutted bolts.

The Anderson open type spark arrester located in the smokebox was composed of a drum-like base 57 inches in diameter by 36 inches in height, fitted with sixteen 3/8-inch vertical vanes, set at an angle to produce a whirling or cyclonic action to the gases when they were drawn into the drum by the exhausting steam. The lower ring of the spark arrester drum was bolted to the nozzle stand 5 inches below the top of nozzle. Two blower tips were located inside the drum, one on the right and the other on left side of nozzle.

EXAMINATION OF PARTS INVOLVED

When the front end of the locomotive was opened and the appurtenances within the smokebox were examined, the base of the petticoat pipe was found to have been torn loose from the top ring of the spark arrester drum. Four of the six bolts which attached the stack extension to the lower base of main stack had been sheared. The tip of blower pipe on right side of main nozzle was badly cut and this condition had evidently caused deflection of the products of combustion which resulted in cinder cutting and wasting away of a large area on the left side of petticoat pipe. The openings around fire door and stoker holes were in fair condition.

INSPECTION AND REPAIR REPORTS

The last annual inspection was made on September 3, 1953. Last quarterly and monthly inspection was made at Ottumwa, Iowa, on December 6, 1953, and the locomotive had made approximately 712 miles since this inspection.

Daily inspection and repair reports on file at Kansas City, Mo., Laredo, Mo., and Ottumwa, Iowa, enginehouses for a period of 30 days prior to the accident were examined and no items were found reported that had any bearing on the accident.

SUMMARY OF EVIDENCE

The engineer stated he was called for Extra 382 East at Kansas City at 8:30 p.m., December 20; he looked the locomotive over before departure and did not see any leaks in or about the

firebox and noted nothing unusual in the operation of the locomotive or train during the trip prior to time of the accident; he was working about one-half throttle and engine was steaming properly; when the fire, steam, and water entered the cab he immediately closed the throttle and went back on the tender. Because of the heat and poor visibility in the cab he could not locate the emergency brake valve located in the gangway at right back corner of the cab. He saw the fireman on the catwalk at the left side of the cab and told him to open the front angle cock. The fireman complied and the train was stopped.

The fireman who had escaped by the left gangway stated that he made his way to the front end and turned the angle cock, stopping the train. He then went in search of the brakeman and learned that he had been injured and taken to the caboose. The intact train was pulled by another locomotive into the siding at Chillicothe where the locomotive was secured and placed in charge of a watchman.

The accident was primarily caused by cinder cutting of petticoat pipe until a large portion of the left side of pipe was wasted away. As this cutting action progressed two or three spot welds were detached, thus permitting the base of the pipe to vibrate excessively. As the vibrational action continued the remaining spot welds around the base of the pipe were detached and four of the six bolts at the top of stack extension were sheared, thereby permitting the stack extension and petticoat pipe to swing from the two remaining bolts. This free movement permitted the lower end of petticoat pipe to move forward until it passed the leading edge of the exhaust nozzle. In this location steam from the nozzle could no longer escape through petticoat pipe and stack but was deflected backward through the flues and firebox.

The manufacturer specified that bottom edge of petticoat pipe be flared and bolted securely to the top ring of spark arrester. The bottom edge of the petticoat pipe involved in the accident was allowed to rest on the top ring of the spark arrester and was spot welded to the ring.

The defective conditions which caused the accident could have been noted during required periodical inspections, and the accident thereby avoided.

CAUSE OF ACCIDENT

It is found that this accident was caused by a defective and improperly applied petticoat pipe.

Dated at Washington, D. C., this 10th day of March, 1954.

By the Commission, Commissioner Clarke.

SEAL

GEORGE W. LAIRD,
Secretary.

